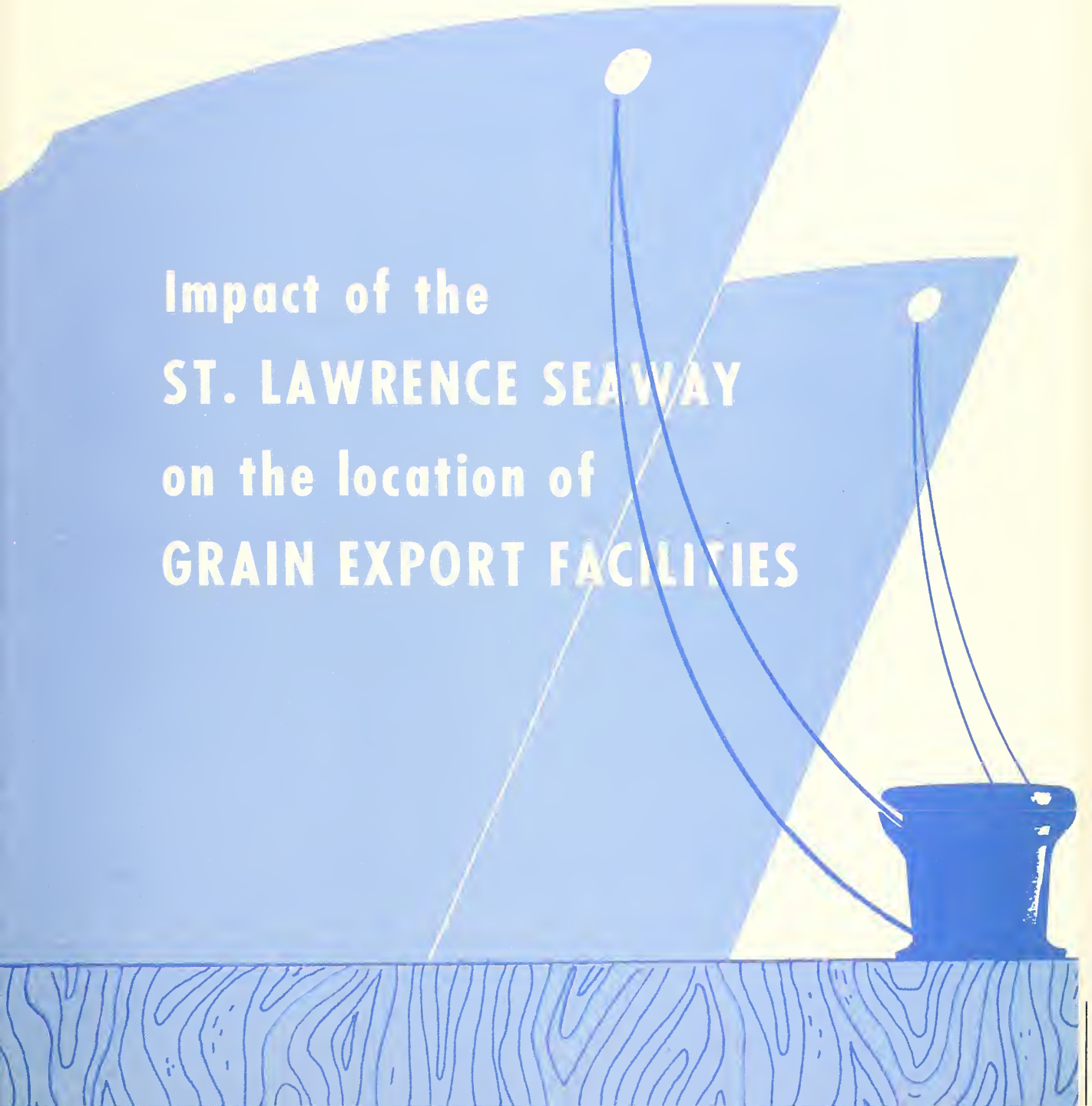
MARKETING RESEARCH REPORT NO. 442
Agricultural Marketing Service
Marketing Economics Research Division

U. S. DEPARTMENT OF AGRICULTURE

Impact of the ST. LAWRENCE SEAWAY on the location of GRAIN EXPORT FACILITIES



PREFACE

This study is part of a broad program of research conducted by the U. S. Department of Agriculture to improve the marketing of agricultural products.

Major groups associated with grain exports have a considerable interest in the potential impact of the improved Great Lakes-St. Lawrence Seaway upon the flow of domestic grain to export. Any major change in the flow pattern may cause a shift in the location of port facilities handling grain for exports.

Past studies by the U. S. Department of Agriculture on the St. Lawrence Seaway emphasized the potential savings in transportation costs that might be gained through use of the new Seaway in overseas trade. The present study analyzes results of the first year of operation of the improved Seaway in overseas grain export trade and studies the effect of the Seaway on the volume of grain shipped from other port areas.

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December 1960

SUMMARY AND CONCLUSIONS

The improved Great Lakes-St. Lawrence Seaway in 1959, its first year of operation, carried about 87 million bushels of United States grain in direct overseas trade. About 95 percent of this volume was shipped to West Europe. In addition, some 27 million bushels of United States grain was transshipped at Canadian ports for shipment overseas. In 1958, lake shipments to overseas destinations totaled only 4 million bushels. The sharp increase in exports from lake ports indicates that during 1959 other port areas may have shipped nearly 110 million bushels less in grain exports than they would have except for the Seaway.

The major impact of the larger lake exports in 1959 upon grain elevators of other regions was felt by those along the Atlantic coast. The Seaway had little effect on grain exports through ports of the Gulf of Mexico. A substantial amount of grain originating in the Midwest moves by water to the Gulf for export, and this route still appears to be cheaper to many destinations overseas than the Great Lakes route. The Seaway had practically no effect on the volume of grain exports moving through the ports on the Pacific.

The importance of the Atlantic ports in grain export trade has been declining steadily in recent years, despite the continuous increase in grain exports from the United States. In 1956, Atlantic ports exported 277 million bushels of grain; in 1959, they exported only 168 million bushels. In contrast, the Gulf ports in 1959 shipped 510 million bushels of grain, or nearly 80 percent more than in 1956.

In view of the decline in grain exports through the ports of the Atlantic, and the increase in exports through the Gulf ports, several new port facilities have been built in recent years along the Gulf. Thus, before the opening of the improved Seaway, some major shifts in the grain handling facilities in export trade had already taken place. New facilities were also built on the Great Lakes. Existing facilities are being improved to accommodate larger ocean-going vessels. With the new Seaway in operation, it appears that under present conditions export of grain is tending to shift away from the Atlantic ports.

It has been estimated that the Atlantic ports require a minimum annual volume of 250 million bushels of export grain to keep all of their export elevators in profitable operation. A prolonged period with total volumes below 250 million bushels would undoubtedly cause some Atlantic port elevators to experience financial difficulties unless they have the opportunity to convert their operations to long-term storage.

In addition to the direct impact of the Seaway, several other factors affect the location of grain-handling port facilities and the flow of grain in export trade. For example, lake ports can expect to gain further in export volume, relative to other ports, especially those on the Atlantic, if (1) railroads and other inland carriers are able to retain their rates to the lake ports in direct competition with other carriers supplying export grain to the Atlantic and Gulf ports, (2) West Europe continues to demand large volumes of United States feed grains, (3) the Seaway and lake ports are further improved,

(4) ocean freight rates do not rise sharply relative to the rates of domestic inland carriers, and (5) grain-exporting firms adjust to the changing transportation situation brought about by the new Great Lakes-St. Lawrence Seaway. Should any of the changes in the above factors move in the opposite direction, this would of course benefit Atlantic ports in relation to lake ports. For example, a more favorable rail rate structure to the Atlantic may increase volume of grain moving through Atlantic export elevators as evidenced by the downward revision of rail rates in mid-1959 by lines serving the Atlantic ports. The impact of all these factors will not materialize at once. However, under existing conditions, grain exports through the Seaway will increase gradually, largely at the expense of the Atlantic ports. Under present conditions the Atlantic ports may have difficulty retaining the minimum volume of 250 million bushels of grain.

IMPACT OF THE ST. LAWRENCE SEAWAY ON THE LOCATION OF GRAIN EXPORT FACILITIES

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INTRODUCTION

About 87 million bushels of United States grain moved directly overseas through the improved Great Lakes-St. Lawrence Seaway in 1959, as against only 4 million bushels in 1958. In addition, some 27 million bushels of transshipped United States grain moved from Canadian ports overseas in 1959. Before 1959 practically all United States grain exports moved through port facilities on the Atlantic, Gulf of Mexico, and Pacific coasts. The sudden increase in exports through the Great Lakes in 1959 suggests that a combined volume of up to 110 million bushels of grain was diverted from other port areas to the lake ports. 1/ Total overseas grain shipments by lake ports in 1959 represented nearly 12 percent of all grains exported from the United States.

It is generally believed that the potential of the Great Lakes-St. Lawrence Seaway in overseas grain trade is much greater than the 1959 overseas exports indicate. A further substantial increase in exports through lake ports, without a proportionate increase in overall grain exports from the United States, would divert additional volume from other port areas and would deteriorate further the competitive position of export elevators already affected by the Seaway. The ultimate result of these diversions may be a shift in grain terminals to the Great Lakes where the volume of grain export trade may justify additional grain-handling facilities.

The present study investigates the probability of future changes in location of grain-handling port facilities as a result of the use of the improved Great Lakes-St. Lawrence Seaway by the grain export trade. An analysis of the impact of the lake exports of grain in 1959 on other port areas provides a background for evaluating the major factors which might ultimately be responsible for changes in the domestic flow pattern of export grain and, consequently, for changes in the location of grain-handling port facilities.

Because the main objective of this study is to evaluate the effect of the Seaway on the volume of grain exported from other ports, changes in volume not

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1/ The actual combined loss in exports by other port areas in 1959 may have been less than 110 million bushels of grain, since part of the gain in lake exports may have been due to increased foreign demand for United States grain via a cheaper transportation route.

directly attributable to the operation of the Seaway in grain export trade are not discussed. 2/

THE IMPACT OF THE SEAWAY IN 1959

From many interior points in the United States, exports through the Great Lakes are cheaper than through other port areas to many foreign countries, because lake ports can utilize more of the cheaper water transportation than can other ports. Lake ports, therefore, have a locational advantage over other ports for many commodities in export trade. This is particularly true of various grains produced in the areas surrounding the Great Lakes.

Developments

Until 1959 the Great Lakes-St. Lawrence Seaway remained primarily an inland waterway. The relatively shallow channels and ports, with an average minimum draft of 14 feet, could not accommodate large ocean-going vessels. Export shipments from United States lake ports were largely restricted to Canada, and only small amounts of grain and other products moved directly overseas. A large volume of export grain went by water from Duluth-Superior to Buffalo and by rail from Buffalo to Atlantic ports to be unloaded into ocean-going vessels.

Improvements

To open the Great Lakes to larger ocean-going vessels the United States and Canadian Governments undertook jointly to improve the Great Lakes-St. Lawrence Seaway. 3/ The project consisted of building new locks and deepening existing locks and channels to 27 feet along the entire waterway. Construction under the Canadian authorization was largely designed to improve the waterway between Montreal and the Welland Canal, which connects Lake Ontario and Lake Erie (fig. 1). This was completed in 1959. Construction under the United States authorization was designed to provide deep navigation works and dredging to the controlling depth of 27 feet in the Thousand Island Section of the St. Lawrence River and to deepen the connecting channels between the Great Lakes. This work is expected to be completed by 1962.

2/ For example, changes in demand for United States grain in countries in which lake ports cannot compete with other ports may also have significant effects on grain volume passing through the facilities of these other ports. Under these circumstances changes in volume in these ports would be independent of the effect of the Seaway.

3/ The Canadian St. Lawrence Seaway Authority Act of 1951 and the United States Wiley-Dondero Act of 1954 authorized the construction of the new waterway. In addition, the United States Blatnik Act of 1956 authorized the deepening of the connecting channels to 27 feet between the Upper Great Lakes. The improvements are estimated to cost about $620 million, of which the United States contribution will amount to $150 million.

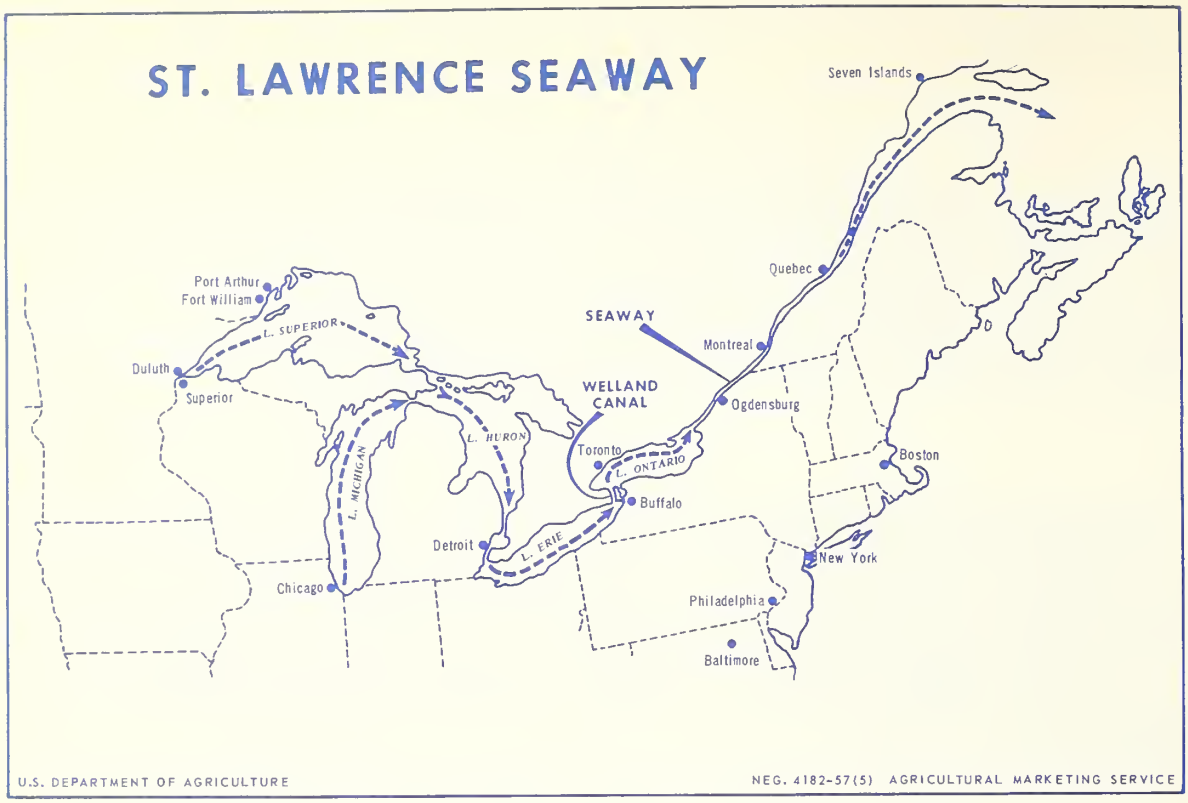

Figure 1

The opening of the navigation season on the Great Lakes in 1959 marked the first time that large ocean-going vessels (up to 10,000 deadweight tons of "Liberty" class and tankers and bulk carriers with even larger volume) could ply the St. Lawrence River and the Great Lakes and could carry cargo directly between lake and overseas ports. 4/

Limitations

Although major improvements have been made, important limitations of the Great Lakes-St. Lawrence system still remain. The season of navigation on the Great Lakes is limited to about 8 months, from about the middle of April to the middle of December.

The capacity of the Welland Canal, long a bottleneck in this navigation system, is a major factor limiting the cargo capacity of the entire water system. The Canal's capacity is governed by two major factors--the number of lockages per season and the capacity of the vessels using these locks. It is

4/ Since the deepening of connecting channels and ports on the Great Lakes will not be completed until 1962, many large vessels cannot be loaded to capacity. These ships are usually topped off at Seaway ports where the minimum 27-foot draft permits fully loaded vessels to navigate.

estimated that, even with some further improvements on the Welland Canal, the waterway capacity will be limited to about 100 million gross tons a year in each direction.

Many of the harbors on the lakes have a minimum navigable depth of less than 27 feet, and the port facilities are still not adequate to handle large ocean-going vessels efficiently.

Thus far, there has been no indication of traffic congestion due to space limitation in the Welland Canal. Congestion along the entire water system during 1959 stemmed primarily from inexperience in handling large vessels on the Great Lakes and the St. Lawrence River, causing many delays in shipping and inefficiencies in operation. However, should volume increase beyond the estimated capacity of the Welland, some congestion may occur. Substantial quantities of bulk commodities other than grain, such as iron ore and coal, are expected to move on the waterway. These commodities may compete with grain for the limited, although recently enlarged, capacity of the Welland Canal.

Exports

Until 1959, the major outlet for Great Lakes exports of United States grain was Canada (table 1). Because of their geographical location, lake ports appear to be a natural source of supply for Canadian grain imports. Corn and soybeans, which are grown in large volume in the areas surrounding the Great Lakes, account for much of the United States grain exports to Canada. Before 1959, only small quantities of United States grain, mainly flaxseed, were shipped directly overseas from U. S. lake ports.

Lake exports of United States grain in 1959 changed considerably, both in volume and destination. Not only did the overall export volume increase more than fourfold over 1958, but West Europe replaced Canada as the largest single outlet. 5/ The improved waterway not only enabled the lake ports to increase their export volume but it also permitted them to increase their overseas shipments significantly over 1958 (table 1). West Europe accounted for 95 percent of all direct overseas shipments from United States lake ports. Before 1959, Great Lakes overseas exports averaged only some 14 percent of the total Great Lake exports of grain while in 1959 this percentage rose to over 62 percent of a much larger export volume. In 1959, overseas grain shipments from lake ports represented nearly 12 percent of the total United States grain exports.

Corn, barley, and oats represented nearly three-fourths of all direct lake exports in 1959. More significantly, these three feed grains represented over 80 percent of all direct overseas shipments of grain from lake ports (table 2). Smaller quantities of flaxseed, soybeans, and spring wheat were also shipped overseas.

5/ In view of the limited information available on the 26.7 million bushels of United States grain which moved in 1959 first to Canadian ports and later overseas, this report considers this volume as Canadian imports and therefore excludes it from direct overseas shipments.

The port of Duluth-Superior accounted for 62 percent of all lake grain exports, Chicago 26 percent, and Toledo 9 percent. Saginaw and other ports accounted for the rest of grain exports in 1959.

Table 1.--Exports of grain from United States Great Lakes ports to major geographical areas, 1956-59 1/

Year	Canada	West Europe 2/	Latin America	Total
	Mil. bu.	Mil. bu.	Mil. bu.	Mil. bu.
1956	11.7	3/	---	11.7
1957	18.8	7.0	---	25.8
1958	4/25.7	4.3	---	30.0
1959	4/47.6	5/85.4	4.4	137.4

1/ Based on weekly reports of inspections by licensed grain inspectors, AMS.
2/ Countries served by ports on the Atlantic coast of Europe.
3/ Less than 0.5 million bushels.
4/ 1958 includes small amount of grain shipped to Canadian ports for transshipment to Europe. 1959 includes 26.7 million bushels of transshipped grain.
5/ Includes 3.5 million bushels reported as exports to other countries mainly in West Europe and 0.4 million bushels shipped to the Mediterranean area.

Table 2.--Direct exports of grain from United States Great Lakes ports to West Europe, by type of grain, 1959

Type of grain	Volume	Percentage of total
	Mil. bu.	Percent
Oats	31.4	36.8
Barley	22.3	26.1
Corn	18.5	21.7
Flaxseed	4.7	5.5
Soybeans	3.1	3.6
Spring wheat	3.9	4.5
Other 1/	1.5	1.8
Total	85.4	100.0

1/ Include smaller amounts of wheat other than spring wheat, and rye.

The Competitive Position of Lake Ports in Grain Export Trade

To evaluate the competitive position of ports on the Great Lakes in the grain export trade, three major aspects of the 1959 lake shipments must be recognized:

1.-Because of their advantageous location, these ports always have had a secure near-monopoly on United States exports of grain to Canada, at least in those grains which form the bulk of Canadian imports, such as corn and soybeans. Other port areas, therefore, are not expected to ship these grains to Canada in any substantial quantities.

2.-Since West Europe accounted for more than 95 percent of all overseas exports of grain from United States ports on the Great Lakes in 1959, the impact of the increase in lake exports must be greatest on those United States port areas which in the past shipped a significant proportion of their grain exports to West Europe.

3.-Three major feed grains--corn, barley, and oats--represented the bulk of lake exports of grain to West Europe in 1959. Consequently, other port areas are likely to lose trade in these grains.

The following analysis, therefore, will consider only that volume of exports which moved to West Europe, through various port areas, with particular emphasis on those types of grains which formed the bulk of the lake direct overseas exports. 6/

Relative Importance of West Europe

West Europe's grain-deficit position is well known. 7/ In 1959 West Europe imported 351 million bushels of six grains from the United States, 43 percent more than in 1958 (table 3). 8/ In 1959, West Europe imports of these six grains amounted to 70 percent of all grain imports from the United States, while in 1958 they represented 60 percent. In the past West Europe usually took over one-half of the United States overseas exports of all grains.

West Europe in 1959 took 78 percent of all United States barley exports, 80 percent of all corn exports, and 97 percent of all oats exports.

6/ Obviously, exports to other foreign markets, including grains not exported from the lake ports, may be more important to some port areas than exports of feed grains to West Europe. However, since this study appraises the impact of the Seaway on other port areas, the study must be limited to West Europe and to those grains which are likely to form the bulk of future Great Lakes exports.

7/ Countries served by ports on the Atlantic Coast of Europe.

8/ The six grains are those which lake ports shipped overseas.

Table 3.--United States exports of grains to West Europe and to all countries, by major port areas, 1958 and 1959

Destination and kind of grain	Atlantic ports		Gulf ports		Pacific ports		Great Lakes ports 1/		All U. S. ports	
	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959
To West Europe:	Million bushels	Million bushels	Million bushels	Million bushels	Million bushels	Million bushels	Million bushels	Million bushels	Million bushels	Million bushels
Barley	21.5	1.9	21.9	14.4	32.3	46.3	---	22.3	75.7	84.9
Corn	42.4	46.5	53.1	89.7	---	---	---	18.5	95.5	154.7
Flaxseed	---	---	.3	.7	---	---	4.3	4.7	4.6	5.4
Oats	12.7	5.6	8.6	6.9	---	---	---	31.4	21.3	43.9
Soybeans	9.3	12.4	24.5	39.5	---	---	---	3.1	33.8	55.0
Spring wheat	10.4	.2	5.2	3.4	---	---	---	3.9	15.6	7.5
Total, 6 grains	96.3	66.6	113.6	154.6	32.3	46.3	4.3	83.9	246.5	351.4
To all countries, all grains	182.3	167.6	422.6	510.4	171.3	156.2	7.0	89.8	783.2	924.0
Percentage distribution of exports to West Europe, by port areas	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Barley	28.4	2.2	28.9	17.0	42.7	54.5	---	26.3	100.0	100.0
Corn	44.4	30.0	55.6	58.0	---	---	---	12.0	100.0	100.0
Flaxseed	---	---	7.0	13.0	---	---	93.0	87.0	100.0	100.0
Oats	59.6	12.8	40.4	15.7	---	---	---	71.5	100.0	100.0
Soybeans	27.5	22.5	72.5	71.9	---	---	---	5.6	100.0	100.0
Spring wheat	66.7	2.7	33.3	45.3	---	---	---	52.0	100.0	100.0
Total, 6 grains	39.1	19.0	46.1	44.0	13.1	13.2	1.7	23.8	100.0	100.0

1/ Includes only direct exports.

If there is any change in the competitive position among various port areas in the United States, changes in West Europe's feed imports from the United States probably will be one of the major causes.

Competition for West European Markets

The competitive position of the Great Lakes ports for trade with West Europe was considerably enhanced during 1959, primarily at the expense of the Atlantic ports. While West Europe imports of the six grains in 1959 from the United States show an increase of 43 percent over 1958, the Atlantic Coast exports to this area declined about 31 percent. 9/ At the same time that direct lake exports to West Europe increased from 4 million to 84 million bushels, Gulf and Pacific ports increased their shipments to West Europe in about the same proportion as West Europe increased its imports from the United States.

Changes in the competitive positions of the Great Lakes and the Atlantic ports in West Europe grain trade are also demonstrated by changes in the proportion of United States grain exports shipped to West Europe by these two port areas. In 1958, the Atlantic ports accounted for 39 percent of the United States exports to West Europe but in 1959 only 19 percent. Direct lake exports of these grains to West Europe in 1958 were only about 2 percent of the total United States shipment to West Europe while in 1959 they rose to 24 percent. Gulf and Pacific ports shipped about the same proportion of the United States exports to West Europe in both years (table 3).

These changes in the competitive position of the various port areas in regard to exports to West Europe indicate that the only measurable impact of the Great Lakes exports in 1959 was on Atlantic ports. The fall in the Atlantic share of the West Europe market closely approximates the gain of lake ports in this area.

Barley exports from Atlantic ports to West Europe dropped from 21.5 million bushels in 1958 to 1.9 million bushels in 1959. Oat exports dropped from 12.7 million bushels in 1958 to 5.6 million in 1959. Although Atlantic ports shipped more corn to West Europe in 1959 than in 1958, their share of these exports declined significantly. These declines in shipments by the Atlantic ports are again closely balanced by a similar increase in lake shipments in these commodities.

The above analysis points out that by far the greatest impact of the improved Seaway fell on the Atlantic port elevators. Atlantic ports lost a substantial volume of exports--both in absolute and relative terms--to West Europe. As a whole, Atlantic ports in 1959 exported some 30 million bushels less of the six grains to West Europe than in 1958, despite the gain of 105 million bushels in U. S. exports to West Europe.

9/ In both 1958 and 1959 movement of grain was fairly normal since grain exporters could largely control the routing from grain storage points to ports of exit. In earlier years, grain movements for exports were often influenced by the availability of Government-stored grain in various port areas.

Since almost all of the lake exports to overseas destination went to West Europe, results of the first year's operation of the Seaway may seem to indicate that lake ports are unable to compete successfully with other port areas for exports to other foreign markets. This is not necessarily so. Strictly from the point of view of transportation cost, many interior points in the United States can ship grain through the Great Lakes to various destinations overseas more cheaply than through other port areas. Lake ports, however, appear to have locational advantage in export trade mainly in the three feed grains--corn, barley, and oats--and perhaps spring wheat and flaxseed, grown in areas surrounding the Great Lakes. Since foreign demand for these grains at present is heavily concentrated in West Europe, lake ports are not likely to ship substantial quantities to other foreign areas where demand currently is relatively small or nonexistent, even though shipments through lake ports may be cheaper.

Grain shipments to West Europe in 1959 indicate that lake exports had little effect on exports from Gulf ports. This is due primarily to the large system of navigable rivers flowing through the North Central States toward the Gulf. Many markets in the major feed-grain producing areas are situated on these rivers, and rely heavily on barge movement of grain to the Gulf Coast. River transportation and ocean shipment is in many cases cheaper than movement of grain by rail or truck to lake ports and from there by ship to the same overseas destination. This river system appears to limit considerably the tributary area of the lake ports.

Because of the distance of Pacific ports from the major feed-grain producing areas of the Midwest, lake exports had little, if any, effect on grain exports through the Pacific ports. In 1959, barley, grown mainly in the West, was the only major feed grain exported to West Europe from Pacific ports.

The Real Impact on the Atlantic

The fact that the Atlantic ports lost some 30 million bushels in export volume to West Europe does not necessarily mean a corresponding overall loss in volume by these elevators. In fact, the Atlantic ports in 1959 shipped only 15 million bushels less than in 1958. It appears, therefore, that about one-half of the loss in the West European market has been offset by increased exports to other areas.

The real impact of the Seaway on the Atlantic ports, however, cannot be measured in terms of the net loss of 15 million bushels. Two factors which should have benefited Atlantic ports only partly offset the shift in export trade to the lake ports. These were West Europe's increased demand for grain and the reduction in rates by eastern railroads.

West Europe imports from the United States of the six grains listed in table 3 were 43 percent higher in 1959 than in 1958. It is not possible to estimate accurately how much of this increase was due to lower shipping costs resulting from the Seaway and how much was due to the increased need of West Europe for United States feed grains. Undoubtedly both reasons were important. Because of the feed deficit position of West European countries and their

increased need for feed grain, particularly corn, it is quite possible that, even without the improved Seaway in 1959, exports of feed grain to West Europe would have been higher than in 1958. The increase could have moved through Atlantic and Gulf ports. Perhaps an additional 30 to 40 million bushels of feed grain would have moved through the Atlantic ports in 1959 had the improved Seaway not been in operation.

Another factor of considerable importance to both port areas was the reduction in rail rates by eastern railroads for export grain shipped to the Atlantic ports in 1959. The first and most obvious impact of the opening of the Seaway in 1959 was the reduction in grain exports moving through the grain terminal facilities of the Atlantic coast. The eastern railroads supplying these ports with export grain suffered loss of volume. To regain at least part of this loss the eastern railroads, effective June 18, 1959, reduced rates on grain for export from most areas east of the Mississippi and north of the Ohio River to Atlantic ports. Because rate reductions were not effective on grain covered by original billing dates prior to June 18, 1959, their effect did not show up in exports until about September 1959 (table 4). After the opening of the navigation season on the Great Lakes in mid-April of 1959, Atlantic port exports to West Europe showed a sudden drop in May, and continued at a low level until September. The sudden rise in exports from the Atlantic ports in September 1959 reflected at least partially the effect of the lower rail rates by eastern railroads to the Atlantic. Part of this rise, of course, may have also been due to the increased availability of local grain for exports, after harvest. The heavy exports by Atlantic ports in December reflected the closing of the navigation season on the Great Lakes in the middle of the month.

While eastern railroads have been successful in regaining some volume lost to the lake ports, they--and consequently the Atlantic ports--appear to have lost almost completely exports of barley and oats. Corn exports from Atlantic ports, however, increased sharply in September. There was also an increase in soybean exports. Since West Europe is the main importer of corn from the United States, the immediate impact of the rate reduction was to increase grain shipments from Atlantic ports to West Europe. Without these rate adjustments, therefore, it is logical to assume that lake exports could have been 20 to 25 million bushels higher in 1959. 10/

Without increased West Europe imports and rate reductions by the eastern railroads, the impact of the Seaway on the Atlantic ports would have been considerably greater in 1959. It appears, therefore, that the 15-million-bushel loss in grain exports in 1959 by the Atlantic ports severely underestimates the potential impact of the Seaway on the Atlantic ports.

Through its effect on the Atlantic ports, the Seaway indirectly also had an adverse effect on some of the Great Lakes ports. Buffalo is an example.

10/ It is of course difficult to estimate the exact volume which railroads and, consequently, the Atlantic ports regained during the last 4 months of 1959. Part of this increase undoubtedly may be attributed to lower rail rates on export grain. However, the increase was quite possibly influenced also by increased availability of local crop after the harvest season began.

In the last 15 years railroads transported an average of 34 million bushels of grain from Buffalo to the eastern seaboard. Buffalo received much of this grain by water from Duluth. In 1959, railroad shipments amounted to only 2.4 million bushels. Thus, while Buffalo, as an important flour milling center, still received its grain for milling, the flow by rail from Buffalo to the eastern seaboard for export during 1959 has been largely diverted to the Seaway. An estimated 30 million bushels of grain previously unloaded at Buffalo and shipped to eastern ports may have bypassed this port. 11/

Table 4.--Exports of selected grains to West Europe through Atlantic ports, 1959, by months

Month	Spring wheat	Oats	Barley	Corn	Soybeans	Total
	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels	1,000 bushels
January	---	772	238	1,966	1,768	4,744
February	---	2,330	716	1,426	1,413	5,885
March	183	1,025	282	464	1,029	2,983
April	---	1,175	220	985	964	3,344
May	---	---	---	1,503	849	2,352
June	---	---	---	160	56	216
July	---	---	170	555	97	822
August	---	---	33	1,525	237	1,795
September	---	---	35	6,847	172	7,054
October	---	---	---	4,118	132	4,250
November	22	---	61	12,562	2,895	15,540
December	---	342	100	14,410	2,790	17,642
Total	205	5,644	1,855	46,521	12,402	66,627

Terminal Port Elevators

Any shift in terminal port facilities away from present locations will depend on the volume of grain available for export from such locations. If the annual volume remains below a certain minimum required for profitable exports, some grain-handling facilities in these areas may face operating difficulties. Comparing the actual volume of exports with this minimum shows the relative economic positions of those elevators in export trade. Although emphasis is placed on the Atlantic ports, other port areas, primarily for comparative purposes, will also receive consideration.

11/ The loss of grain by Buffalo ports in 1959 is not entirely attributed to the Seaway. Buffalo port receipts in recent years were also adversely affected by increasing barge movements of grain to the Gulf.

Facilities

There were 69 port elevators in 1959 in the United States with facilities for loading ocean-going vessels; 30 were on the Great Lakes, 14 on the Atlantic, 10 on the Gulf, and 15 on the Pacific coast. 12/ They had a combined annual storage capacity of about 240 million bushels, of which about half was located on the Great Lakes (table 5).

Except for the port elevators on the Great Lakes and for several on the Pacific coast, the major function of most port elevators is to handle export grain, and the operators of these facilities place little emphasis on long-term storage or domestic trade operations. More important, these alternatives to export operations are seldom available. Thus, as a general rule, the amount of grain which port elevators can handle annually in export trade largely determines the profitability of their operation.

Minimum Annual Volume

A rough measure of profitability of an export elevator is the minimum annual turnover of the rated annual storage capacity. Whenever the turnover is below a required minimum, operations are not profitable. Table 6 shows a schedule, prepared from various trade sources, that approximates the relationship between the annual storage capacity of a port elevator used almost exclusively for grain exports and the minimum annual turnover of this capacity required for profitable operation. It is generally agreed that a port elevator with a small storage capacity may require a much more rapid turnover for profitable operation than a port elevator with a large storage capacity. This is mainly due to three factors. First, a large elevator may require a proportionately smaller amount of working space for export operations than a small elevator. Thus, part of its capacity may be used for storage, which provides additional income. Second, given an identical percentage utilization of storage capacity, large elevators usually have lower fixed and variable costs per bushel handled than small elevators. Third, a large storage capacity may provide more opportunity to perform a better paying job of blending, particularly when these facilities are operated by the exporters.

The schedule outlined in table 6 is a rough approximation of the minimum turnover required by various sizes of export elevators. In actual practice, the minimum turnover of export elevators may vary from place to place even for the same size of plant, depending on local conditions of operating costs, grain supplies, opportunities for storage operations and domestic trade, and even differences in management practices. The schedule is less applicable to most of the port elevators on the Great Lakes and the Pacific coast, many of which also provide a considerable amount of long-term storage.

Storage capacities on the Atlantic coast average about 3.2 million bushels per elevator, while on the Gulf coast the average capacity is about 3.1 million bushels. On the basis of the storage capacities of the individual port

12/ There is no information on the number of elevators actually used in export trade during 1959.

Table 5.--Capacity, turnover, and annual volume of elevators capable of loading ocean-going vessels, United States, 1959, by major port areas

Port area	Port elevators capable of loading ocean-going vessels	Combined storage capacity of elevators	Estimated annual minimum requirements for profitable operation		Exports			Estimated excess (+) or shortage (-) of capacity 1959 3/
			Turnover 1/	Volume 2/	1955-57 average	1958	1959	
	Number	Million bushels	Number	Million bushels	Million bushels	Million bushels	Million bushels	Million bushels
Atlantic	14	45.0	5.6	250	244.0	183.0	168.0	+ 15.0
Gulf	10	31.0	5.8	180	267.0	422.0	510.0	- 57.0
Pacific	15	45.0	---	---	---	---	---	---
Great Lakes	30	120.0	---	---	---	---	---	---
Total	69	241.0	---	---	---	---	---	---

1/ Annual minimum turnover for each individual elevator was determined on the basis of table 6. Port area minimum turnover, required for profitable operation, is a weighted average for each area based on annual storage capacity of individual port elevators.

2/ Combined storage capacity for each area multiplied by average minimum turnover in each port area.

3/ The 1959 export volume in each port area is divided by minimum turnover; the difference between this figure and storage capacity if the port area is the excess (+) or shortage (-) of elevator capacity.

elevators, it has been estimated that the Atlantic ports as a whole require an average annual minimum turnover of 5.6, or a minimum volume of some 250 million bushels, to keep the port elevators at a profitable level of operation (table 5). On the other hand the Gulf Coast port elevators may require an annual turnover of some 5.8, or an annual minimum volume of only 180 million bushels, to keep all port facilities profitable. 13/

Table 6.--Estimated minimum turnover and volume required for profitable operation of port elevators, by size

Annual storage capacity	Estimated minimum turnover	Estimated minimum annual volume
Mil. bu.	Number	Mil. bu.
Less than 1	15.0	7.5
1 - 2	10.0	15.0
2.1 - 3	7.0	17.5
3.1 - 4	6.0	21.0
4.1 - 5	5.0	22.5
5.1 - 6	4.5	24.7
6.1 - 7	4.0	26.0
7.1 - 8	3.5	26.2
8.1 - 9	3.0	25.5
9.1 - 10	2.5	24.0
Over 10	2.0	24.0

Annual Exports

Export data indicate that the Gulf port elevators since 1955 have had a much higher annual turnover and volume than the Atlantic port elevators (table 5). In fact, Gulf ports not only exported more grain year after year than Atlantic ports, but also continuously exceeded the estimated minimum of 180 million bushels. On the other hand, exports from Atlantic ports only once in recent years exceeded the annual minimum volume (in 1956). Since 1956 Atlantic coast exports have been declining.

On the basis of the minimum volume, it has been estimated that the Atlantic ports in 1959 had an excess capacity of some 15 million bushels for export operations or an excess of five port elevators of an average size. This means that, to handle the volume of 168 million bushels of exports of 1959, Atlantic ports would have required only 30 million bushels of capacity or about 10 average-size port elevators to make the export trade through this coast prof-

13/ It should be emphasized, that in estimating profitability of grain export operations for a given port area, it is assumed that each elevator shares the total volume of a port area in proportion to its capacity. In actual practice a few elevators frequently account for most of the port area's export traffic.

itable. The Gulf ports, on the other hand, appeared to have exceeded this minimum turnover rate many times in 1959 and could have operated profitably even with 15 to 20 more port elevators.

The above analysis suggests that grain export operations must have been, year after year, much more profitable for the Gulf ports than for the Atlantic ports.

The capacities indicated for the Atlantic coast, however, tend to overestimate the working capacity for the export operation in any given year because some port elevators were closed part of the time, leaving a larger volume to the remaining facilities.

One notable exception on the Atlantic coast is the different economic position of the elevators of the port of Norfolk. Until 1959, the two elevators located in the tidewater area in Norfolk had a combined storage capacity of about 4.1 million bushels or nearly 10 percent of the entire Atlantic coast capacity. Yet Norfolk has handled nearly one-third of the entire Atlantic exports in recent years. Furthermore, in the face of the declining export volume through the Atlantic ports, Norfolk has been able to increase its absolute volume of exports in most years. Norfolk appears to be the only port on the Atlantic coast able to operate constantly above the required minimum volume for profitable grain export. For this reason, therefore, Norfolk should be considered as an exception among the Atlantic ports. 14/

THE POTENTIAL IMPACT OF OTHER FACTORS

The continuous operation below the estimated minimum profitable volume by the Atlantic port elevators and the continuous operation well above the minimum volume required by elevators on the Gulf Coast has already brought about important shifts in the location of port facilities handling grain for exports. In the last several years new port elevators have been built in Norfolk, New Orleans, Baton Rouge, and Corpus Christi. 15/ Many existing facilities have been modernized and improved. Partially as a result of this construction, exports from Gulf ports in 1959 were nearly twice their annual average for 1955-57. Atlantic ports, on the other hand, in 1959, were handling less than 60 percent of their annual average export volume of 1955-57. The development and improvement of the inland navigable water transportation system serving the Gulf Coast and the more favorable rail rates to the Gulf have been largely responsible for much of this shift.

Building and improving of grain export facilities, however, were not restricted to the Gulf Coast. The expected increase in export volume on the

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14/ Actually in 1959 the port of Boston and particularly the port of New York had higher export volumes of grain than in 1958, despite an overall decline in the volume of exports from Atlantic ports. Much of the increase by the port of New York was due to export shipments of wheat originating from the mothball fleet on the Hudson River.

15/ Some new facilities built on the Pacific coast in recent years were built primarily for long-term storage rather than for export trade.

Great Lakes and the expected impact of the Seaway on Atlantic ports also tended to shift facilities away from the Atlantic. This is demonstrated by the new facilities already built or in the planning stage and the improvements taking place in the existing facilities on the Great Lakes-St. Lawrence Seaway.

The favorable position of the Gulf Coast as contrasted to most Atlantic port elevators in grain export trade appears to be an accomplished fact. The favorable position of the lake ports in relation to most of the Atlantic ports in grain export trade also appears to be certain. The existence of the Seaway places additional difficulties in maintaining the already dwindling volume of the Atlantic port elevators. The immediate and future effect of the Seaway on the export volume of Atlantic port elevators will depend on many factors. The probable effect of these factors is analyzed with particular emphasis on the competitive positions of the lake and Atlantic ports in grain export trade. 16/

Competition Among Railroads

Because railroads still account for the bulk of export grain movements from interior points to many terminal ports, changes in rail rates may substantially alter the flow of grain.

It has been shown previously how rate adjustments by the eastern railroads affected the volume of grain exports through the Great Lakes and Atlantic ports.

With the lowering of the rail rates on export grain by the eastern rail carriers, terminal elevators in the Atlantic ports may have temporarily secured a substantial volume although possibly less than the necessary minimum required to operate all elevators profitably.

The eastern rail rate adjustments soon were followed by similar rate cuts by railroads serving the Gulf ports on grain shipped to Gulf Coast ports. Without this competitive rate adjustment Atlantic port exports probably would have been higher in 1959. It remains to be seen to what extent such competitive rate adjustments will influence future export grain movement.

In 1960, rail lines serving the lake ports have also published new lower tariffs for grain designated to the main ports of the Great Lakes. While this action by the railroads was largely designed to recoup a significant volume lost in recent years to trucks and barges, it may also affect the volume of exports through both the Atlantic and the Gulf. Since in recent years a substantial amount of export grain moved from the Midwest to the Gulf Coast by

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16/ In considering any possible changes in the future domestic flow of export grain, it is necessary to make two restrictive assumptions: (1) The selection of the route for export grain from domestic origins to the final destination overseas will be largely the responsibility of the private trade. This assumption implies that Government programs will not interfer with the normal flow of export grain. (2) It is also assumed that war or other extraordinary events will not disrupt the normal trade relations between the United States and other foreign countries.

water, the new lower rail rates may also induce the rail movement of export grain to the Great Lakes. Lake ports as a result may gain additional competitive advantages over the Atlantic and Gulf ports in overseas grain trade.

It is not possible to predict what the final long-run outcome of the competitive rate adjustment could mean to various ports. However, on the basis of the limited experience gained by recent changes in rail rates by lines serving different port areas, it appears that competitive rate adjustments are capable of offsetting many of the advantages gained by the first railroad line making the downward adjustments.

Competition among railroads for export grain will not be the only factor in determining the future volume of exports through various port areas. The relative level of rates of other carriers will also undoubtedly influence the domestic movement of grain in export trade. Because of the complexity of the competitive rate adjustments among the various carriers it is impossible to forecast the final outcome. However, there appears to be at least one factor limiting declines in rail rates: Operating costs of rail lines. Should the new lower rates approach the out-of-pocket costs, further reductions in rates by these railroads probably will not be sanctioned by the Interstate Commerce Commission.

Foreign Markets

The location and demand of the major feed grain markets abroad may play an important role in changing the competitive position of the Atlantic and lake ports in grain export trade. This would be true of demand for United States feed grains to West Europe. In view of the fact that West Europe's needs in feed grains include also barley and oats, a sudden change in demand for United States feed grains may have a more significant impact on the lake ports than on the Atlantic ports. 17/ The reason for this, of course, is that lake ports will likely ship much barley and oats to West Europe.

West Europe's domestic supplies of the major feed grains are usually insufficient to take care of its domestic needs. During the 5-year period 1955-59, West Europe annual imports from the United States averaged some 186 million bushels of corn, barley, and oats, or nearly three-fourths of the total United States exports in these grains. During this period West Europe imports from the United States varied considerably from year to year (table 7). These changes have been influenced largely by production of these feed grains in West Europe, although feed grain production in East Europe and the growing standard of living of West Europe also contributed to these annual changes in demand.

17/ This section limits its discussion of foreign markets to West Europe only, since it is this market through which the impact of the Seaway is evaluated. Obviously, the level of demand in other foreign market areas for other types of grain may also have a pronounced influence on volume of export grain moving through different port areas.

Table 7.--West Europe production of major feed grains and imports from United States, 1955-59 1/

Crop year	Production				Imports of 3 feed grains 2/
	Corn	Barley	Oats	Total, 3 feed grains	
	Million bushels	Million bushels	Million bushels	Million bushels	Million bushels
1955	65.0	556.4	915.0	1,536.4	190.7
1956	91.7	744.7	1,001.0	1,837.4	132.5
1957	77.5	666.6	785.3	1,529.4	178.8
1958	85.0	687.5	783.5	1,556.0	239.1
1959 3/	91.5	777.7	761.6	1,630.8	285.9

1/ Compiled from reports of Agricultural Marketing Service and Foreign Agricultural Service.
2/ Year beginning July 1.
3/ Production is estimated.

Table 7 indicates that whenever production of the major feed grains in West Europe was relatively high, as in 1956, imports of United States feed grains tended to decline, and when West Europe production was low, imports of United States feed grains tended to be high. The 239 million bushels of feed grain exports to West Europe in 1958-59 was influenced by the 2 preceeding years of relatively low production in this area. Exports to West Europe in 1959-60 exceeded feed grain exports of 1958-59 by a substantial margin despite some increase in feed grain production in West Europe in 1959. Drought seriously reduced pasture, hay, and root crops in West Europe in 1959-60 but had little effect on grains. The increase in United States feed grain exports to West Europe in 1959-60 may be influenced by the still relatively low level of production in West Europe in relation to their feed grain requirements.

The level of feed grain production in East Europe also influences United States exports to West Europe, as periodical surpluses in East Europe have occasionally been disposed of in West Europe. The bumper crop of corn in East Europe in 1959 was some 50 percent larger than the relatively small production in 1958. This may not be a surplus immediately, but if the corn crop of 1960 in East Europe is better than average, a good proportion of the 1959 corn crop may become available for shipment to West Europe. This may adversely affect United States exports of feed grains and the export volume of the port areas.

Replacing of United States feed grains in West Europe on a large scale by East European feed grains, however, is not likely. Improvements in living standards in both West and East Europe, with increasing emphasis on meat diets, require larger amounts of feed grains in both areas. Thus, even another bumper crop of feed grains in East Europe may be easily absorbed in that area and may not measurably reduce West Europe's demand for United States feed grains.

During the years to come, demand by West Europe for United States feed grain and other agricultural products is expected to depend, apart from the level of local production, on the level of economic activity in West Europe. With the expected increase in economic activities and the subsequent improvements in diet, the livestock economy of West Europe is expected to expand further in the next few years. A relatively strong demand for United States feed grains, therefore, is in prospect. This will benefit all port areas, particularly the Great Lakes.

Domestic Supply Patterns

The degree to which grain export facilities can operate profitably in the future will also depend on the local supply patterns of grain. In the past, most of the grain exported through Atlantic ports originated in the Midwest, partially in areas tributary to the Great Lakes. Only small, although increasing, quantities originated near the Atlantic ports.

Production of grain in the Southeastern States is increasing rapidly but in most areas is still well below local requirements. Thus, increased local production of grain that would compensate Atlantic ports for the loss to the Great Lakes is only a distant possibility.

One exception in this area is the port of Norfolk, which has a favorable position in grain export trade. One reason for this is that an increasing proportion of Norfolk's grain exports originates in surrounding States where production of feed grains, particularly corn and soybeans, has been increasing rapidly.

That the port of Norfolk does not expect to lose much trade to the Seaway is demonstrated by the fact that new facilities were recently built to handle an expected increase in grain exports.

Facilities on the Great Lakes

One of the physical limitations of the Great Lakes-St. Lawrence Seaway has already been discussed--inadequate facilities for efficient handling of ocean-going vessels. While in recent years new facilities were built and existing facilities revamped to accommodate larger vessels, the navigable depth of several lake ports is still less than 27 feet. Due to recent improvements in many ports, vessels might be loaded heavier in 1960 than in 1959, but large ocean-going vessels cannot be loaded to maximum Seaway draft in several ports with relatively shallow harbors. This means that the balance of a full load frequently will have to be picked up in other ports with deeper harbor waters. This limitation may still prevent full utilization of lake ports in grain export trade.

Ocean Freight Rates

The general level of ocean freight rates may also affect the domestic flow pattern of grain to port areas. In general, an increase in ocean freight rates indicates, among other things, that shippers expect a good business in trans-

porting high-revenue commodities like general cargo; therefore demand for a low-revenue cargo, like grain, will be slow. Under these conditions, exporters of grain will have to pay a premium to shippers to compensate them for the loss of general cargo. On the other hand, relatively low rates indicate that high-revenue cargo is relatively scarce; therefore shippers will seek whatever cargo they can get, including the low-revenue grain.

With high ocean freight rates, direct overseas shipments of grain via the lakes may be curtailed and shipments from Atlantic ports increased. Theoretically, if ocean rates increase sufficiently relative to railroad and lake barge rates, all-ocean shipping from Duluth to Europe could be more expensive than transhipping from lake barge to ocean vessels in Canadian ports or shipping via the lake-rail-ocean route through the Atlantic ports. Actually, however, such a large relative increase is not to be expected, and a somewhat higher ocean freight rate may have only limited benefits, if any, to the ports of the Atlantic coast.

On the other hand, generally lower ocean freight rates may further increase lake exports, mainly at the expense of the Atlantic ports. Tramp ships may move directly to Duluth, Chicago, and other lake ports and carry grain from lake heads to Europe.

During the winter months of 1959-60 there was some indication that ocean freight rates were strengthening although 1960 charters from lake ports are still at levels close to the rates of the 1959 season. Charters of grain shipments from Atlantic ports early in 1960 were at rates somewhat higher than the highest rates in 1959. If rates increase sufficiently, direct lake shipments of grain in overseas trade in 1960 may be somewhat smaller than during 1959, and indirect shipments overseas may be larger.

Long-run prospects for the ocean freight market are difficult to predict. The generally high level of economic activity indicated for the decade ahead, together with a prospect for an increase in the world trade, suggest that the ocean freight market may be fairly active in the coming years. The firming of the ocean freight rate market in the next few years, however, may be only gradual. It is known, for example, that in 1960 many ships with a substantial cargo capacity were idle. An increase in world trade would have to be substantial to raise ocean freight rates.

Decisions and Uncertainties

Management, both private and public, makes its decisions on the basis of expectations, and these decisions can influence future events. Often these decisions are difficult to make, since future events themselves may be uncertain. Two of these expectations seem to be particularly relevant for the appraisal of the future volume of grain exports from the ports of the Great Lakes and Atlantic coast.

One expectation concerns the improvement of harbor facilities along the Great Lakes, including the building of new elevators. Partially because of uncertainties regarding the rate policies of the railroads, large-scale improvements on the Great Lakes were not completed by the time the Seaway was opened

to large ocean-going vessels. Although extensive developments were in progress during 1959-60, several lake ports after a year of overseas grain trade still lack adequate facilities to handle large ocean-going vessels efficiently. This lack may limit the role of the lake ports in the grain export trade until the improvements are completed.

In the long run, of course, many of the limitations of the lake ports will be removed and uncertainties regarding the role of the Seaway in grain export trade will diminish. Decisions for making the necessary adjustments to new conditions will be easier. These adjustments in the long run may unfavorably affect the export volume of the Atlantic and perhaps the Gulf ports.

The second expectation concerns the ownership and leasing arrangements of port facilities by private companies handling grain for export. Several of these leases or acquisitions were made when the improved Seaway was only a possibility. Since ownership and leasing arrangements are long-term commitments, these facilities will be used as long as operators can cover variable costs. Thus, even though overseas shipments might be cheaper through the Seaway, operators may be compelled to use other facilities. A number of port elevators on the Atlantic that are owned or leased by exporting companies may be more fully utilized in the future in an effort to offset the disadvantageous position of these elevators in some foreign markets. The ability of the exporters to concentrate large volume at rapid turnover in their own facilities and to perform their own blending operations, may even favor Atlantic ports over the Seaway in several foreign markets.

In the past, private grain-exporting companies with investments in port terminals also used port facilities operated by the railroads or port authorities. These facilities may lose business if exporters concentrate their activities in their own facilities or use the Seaway.

It appears that grain terminals on the Atlantic not owned by private grain-exporting companies are likely to be the most directly affected by the Seaway. Should exporters find that their leased facilities cannot compete adequately with the Seaway they will operate only until the leases are terminated.

In 1959 about half of the Atlantic grain exports moved through facilities operated by private grain-exporting companies. Some of these companies also had facilities on the Great Lakes-St. Lawrence Seaway. If they could increase their annual export volume to such an extent that the overall Atlantic volume increases also, expansion of the volume of grain moving overseas through the Great Lakes ports might be restrained. However, such a large-scale increase in Atlantic exports is not likely under present conditions.

* U.S. GOVERNMENT PRINTING OFFICE : 1960 O—576561